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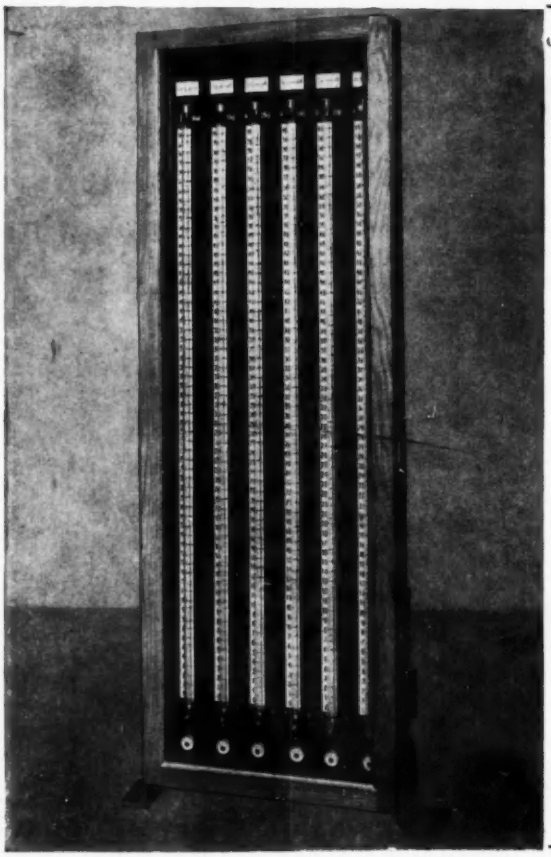

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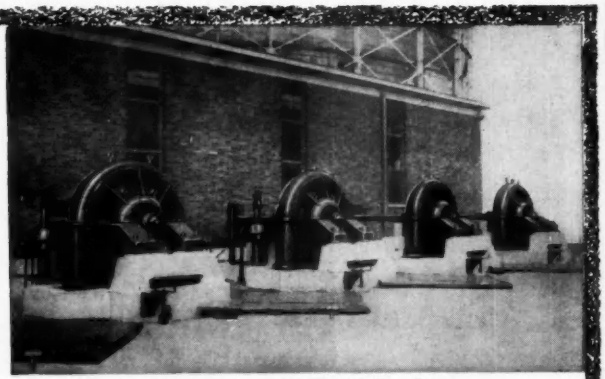

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Gas Journal

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WEDNESDAY DECEMBER 14, 1960

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Publishers' Notice, See Page 374, November 23, 1960

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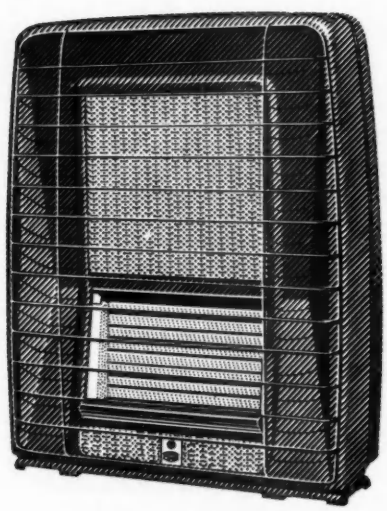

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Gas Journal

COKE OVENS • BY-PRODUCTS • CHEMICALS

Gas in Europe

THE second report now issued by the Gas Committee of O.E.E.C. covers the whole of Europe west of the Iron Curtain with Greece and Turkey —with Yugoslavia as an observer but with no statistics from that country. Gas volumes are corrected to a calorific value of 4,200 kcal. per cu.m. at 0°C. and 760 mm. equivalent to 440 B.t.u. per cu.ft. at 15°C. and 30 in. All forms of gas are included—not only town gas made and sent out from gasworks, but coke oven gas, natural gas and blast furnace gas.

In 1958 the gross availability of gas from gasworks in the whole area was 69% production in gasworks, 24% from coking plants and 7% natural and other gases. Of the 23,880 mill. cu.m. produced in gasworks, 14,340 (more than half) was made in the United Kingdom, 3,760 in Federal Germany, 2,660 in France, leaving only 3,120 mill. cu.m. for the rest of the area.

Seen against the total energy consumption, gas, manufactured and natural but excluding blast furnace gas, accounted in 1958 for 6.9%, a rise from 5.7% in 1950; this in 'end-use' consumption, excluding, that is, quantities consumed in producing other forms of energy. Liquid fuels rose from 14.4% in 1950 to 28.1% in 1958 and appear to be likely to continue to rise. Electric power stands at 8.4%, hard coal at 32.8% and coke at 13.2%. The remainder is accounted for by briquettes, brown coal and blast furnace gas.

While more than half the gasworks production still goes to the 'household sector,' industry (excluding iron and steel) took 41% in 1958. Industry, including iron and steel and the production of electricity, is the biggest overall consumer, taking 67% in 1958 of the total net available gas, an increase of 25% in four years. Actual consumption in the household sector did not vary in real figures, but the percentage fell from 21% in 1954 to 18% in 1958.

Coal is still the main raw material used in the production of manufactured gas, but gasworks use of coal fell from 40.38 mill. tons in 1950 to 38.96 in 1958. The percentage of gas made from oil in gasworks now stands at about 2% of total output, but, says the report, it could amount to 5 or 10% by 1965. Natural gas and total gasification, although growing and likely to grow rapidly, still only represent a very small fraction of gas production.

On the Continent gas is exposed, even more fiercely than in the United Kingdom, to the competition of oil and electricity. There, as here at home, the consumption of oil products has increased in the medium-scale consumer sector during recent years, while the percentage figure for gas consumption has fallen slightly, but 'allowing for the increase in the overall energy requirements in this sector the demand for gas increased by roughly 30% over the same period' (eight years). Oil is used in the household almost exclusively for space heating whereas gas is used mainly for cooking and water heating, but some gas is used for 'additional space heating' and increasing in some countries, particularly Germany, for permanent heating systems—a significant fact in view of the promising situation in this country of gas-fired household space heating.

It must be remembered, of course, that, with the conspicuous exception of Germany, most of the Continental countries have small or no resources of indigenous coal. On the other hand the establishment of large-capacity refineries in Europe, combined with a far-flung sales organisation, has encouraged a widespread use of oil refinery products in every country. Natural gas, although making rapid strides, mostly in three countries—Italy, France and Austria—is still small in proportion.

The technical advantages of gas in the medium scale consumer sector are concisely summed up: 'Fine adjustment of consumption, easy adaptation to various uses, trouble-free supplies to the consumer, no storage, clean burning, no labour involved in stoking appliances, negligible maintenance costs, certainty of supply without political risks.' On the other hand, the gas industry is burdened with some economic disadvantages; inflexibility of price formation, dependence on coal and coke costs and prices, difficulties in coping with seasonal variations in demand, are some of them.

The recent spectacular advance in the development of natural gas has excited a good deal of justified enthusiasm, particularly in France where gas from the Lacq and other deposits in the South West is already piped to Paris and to the eastern provinces. In Italy, in 1956, the consumption of natural gas represented 11% of energy demand and it continues to increase. Similar activity is seen in Austria, the Netherlands and Ger-

many. But on the whole the contribution of natural gas to the total need is still comparatively small. Optimism is reflected in a passage in the conclusions of the report: 'In calorific value . . . output by 1965 should be equal to more than half the expected production of manufactured gas,' referring 'only to the home production of member countries, excluding imports from overseas.'

Our readers have been kept informed of these developments both in France and in the Sahara. As for the latter, 'it should be technically possible, given the volume of proved reserves, to reach a yearly output of 20,000 mill. cu.m. at 9,000 kcal. per cu.m. (say, 940 B.t.u. per cu.ft.) of which 15,000 mill. cu.m. would be available for export to Europe.'

Four pages of the report are devoted to the technical aspects of the transport of natural gas from the Sahara and other areas outside Europe. As to the latter the technique must be that of the Methane Pioneer with which our readers are familiar. And we have reported from time to time experiments which are still in progress in the construction of pipelines from the Sahara. The conclusion of the report is that 'only a trans-Mediterranean pipeline reaching from the gas field to Europe could bring natural gas to European markets in sufficiently large quantities,' though it is, we understand, generally held that this method would be supplemented by tankers to the more distant regions. The present position of the necessary experiments is briefly outlined. 'The choice of route, the external protection given to the pipe, and even the number of pipes laid in parallel are all basic considerations which will determine whether or not Europe can look to the Sahara for reliable supplies of gas. But a pipeline between the two continents will be built and put into operation after several years only.

To put this matter into some perspective, seven pages are devoted to a brief but useful study of the 'Aspects of the natural gas industry in the United States' where by 1958 natural gas reached 29.5% of the total energy consumption in that country. In fact 'three-quarters of total United States energy consumption was accounted for by oil products, natural gas and hydro-power and only one-quarter by solid fuels'—the reverse of the position in Europe.

It is concluded, then, that 'In 1958, manufactured and natural gas supplies, excluding blast furnace gas, represented 6.9% of the total *end-use* energy requirements of the O.E.E.C. member countries. Gas therefore represented a relatively small proportion of all energy used, but it has to be borne in mind that this is one of higher forms of energy, the use of which is restricted almost entirely to the production of heat.'

Average annual increase in the demand for gas over the last ten years has kept pace with the expansion of overall energy requirements and bids fair to continue to do so between now and 1965. In the future expansion of European gas demand natural gas imported from the Sahara and Libya are expected to play an important part. Installations producing town gas, while more and more concentrated in large capacities, 'will tend to become distribution centres for gas manufactured from raw materials, of different kinds and in certain cases, for natural gas,' giving rise to the question whether the last-named should be distributed as such or after re-forming. Active research is in progress.

A growing quantity of available coke oven gas is anticipated, and to take advantage of this it is concluded that the gas industry will have to construct and operate plant with flexible output at a reasonable price, linked up with gasworks and coke ovens on base load and providing these with sufficient reserves to cope with seasonal fluctuations in demand.

Finally, the Gas Committee is considering what aspects of natural gas supply, distribution and uses could usefully be studied at international level, bearing in mind that commercial as well as national interests are involved.

The report concludes with a study of the use of crude or reformed natural gas in the several countries concerned and a number of tables of data relating to the gas industry in the O.E.E.C. countries.

Gentle enchanter

THAT gentle enchanter Mr. Brian Hill, who somehow combines the—dare we say mundane?—task of functioning as Assistant Publicity Manager of the Gas Council with that most exacting of arts, poetry translation, has done it again. Following his translations from Rimbaud, Verlaine, and de Nerval, and a charming anthology, Mr. Hill has another book on the market, this time a translation of 34 poems by Théophile Gautier, the friend of Balzac and Flaubert of whose verse Henry James said 'every hair-stroke tells.'

That delicacy is captured with consumate skill in a book which holds a rich reward for the leisurely and discerning reader. Gautier maintained that 'Nothing is really beautiful unless it is useless.' Mr. Hill's interpretion deserves the word beautiful, but we would certainly not dismiss his book as useless. On the contrary, we found it not only delightful but therapeutic. The title? *Gentle Enchanter.* (Rupert Hart-Davis. 9s. 6d.)

TO I.G.E. READERS

Walter King Limited, wish to thank the members of The Institution of Gas Engineers for their co-operation in a quick-fire and highly successful market research operation. This was inaugurated by our circular letter and reply card sent from Bolt Court on Friday, November 11.

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26th I.G.E. AUTUMN RESEARCH MEETING

Market for natural gas

M. JEAN DHUIN, in presenting the paper, said: According to the programme which was sent to you a few weeks ago, I was to write a paper of my own dealing with the underground storage of gas in France. I am not, however, qualified to speak from such a wide point of view. As you know, there are now two underground storages in France. The first, located in the vicinity of Paris, at Beynes, has been set up by Gaz de France to provide for peak supplies of coke oven gas to this zone of high consumption. The second is that belonging to my company and is located at Lussagnet. Gaz de France undertook explorations with a view to storing natural gas in the Paris region, and it would now seem to be the case that there is a possibility of this near the town of Vernon, about 50 miles west of Paris. Since they took the first steps towards the underground storage of gas in France, those concerned with Gaz de France have many things to say about those techniques. Therefore, in view of the excellent relations established between both companies, I thought it better that they should themselves tell you what they have done.

Gas fields

On the other hand, as I had to talk of Lussagnet, it was not possible to do so without my friend, Louis Socrate, who was the engineer of the project and who took it over at the commencement of the exploration until completion of the storage. I am pleased to state here how much we appreciated the work which he did in that connection.

To revert to the paper, we mention Lussagnet with the intention of indicating a particular function which it assumed provisionally, that is to say, to hasten the establishment of the market for natural gas, to prevent any delay in the development of the Lacq field. As far as we know, it is the first time that an underground storage has assumed such a function. For our purpose, it has been useful to recall the conditions in which the Lacq gas appeared on the French market. We thought that a few considerations, other than technical ones, would not be unsuitable, notwithstanding the nature of this meeting. We knew that British gas engineers have looked forward to the utilisation of natural gas for several years, either imported or produced here. I know that some pessimists take the view that, owing to the relatively small extent of sedimentary basins in the United Kingdom, the probability of discovering it is rather slight. British engineers, however, have so much know-how that I wonder whether anything is impossible for them. I sincerely hope that you will discover gas fields in your country, and I hope that explorations undertaken in different parts, such as Scotland and Yorkshire, will be quite successful.

I believe that, sooner or later, you will encounter this problem of the establishment of a market for natural gas, and we shall be only too happy if our paper can be of any assistance to you in that direction.

Dr. A. E. Haffner, Southern Gas Board: We have listened with interest to this paper by MM. Dhuin and Socrate about the establishment of a market for natural gas. It is surprising to find that there is a problem of disposing of the heaven-sent natural gas—with its high sulphur content and temperature is it that Lacq gas is hell-sent? We should be glad in this country to have the problem. Our own searches for natural gas have been rewarded very trivially and when we hear of the success stories of natural gas in a growing number of countries, it is necessary to purge our minds of envy, and devote ourselves to the study of alternative ways of gaining the benefits of natural gas supply.

It is noteworthy that Lacq gas is now considered as earmarked and sold, and Sahara gas is already being considered to enable production potential to keep ahead of demand. The colossal rate of increase shown in [Table II] can be made a little more graphic if we note that in 1957 Portsmouth could have been supplied, in 1958 the Southern Gas Board, in 1959 to the Southern Gas Board the South Eastern Gas Board could have been added; in 1960 even the North Thames Gas Board could be included and in 1961 the South Western Gas Board could have been added. This total is equivalent to nearly half the British gas consumption, and all this for an investment, including mains, of £125 mill. The rapid and early exploitation of this capital investment was soundly planned.

The need to absorb the growing output was met by reviving a nearby fading natural gas system, by fueling

Presentation and discussion of paper: 'The Establishment of a Market for Natural Gas' by JEAN DHUIN (Head of Gas Department) and LOUIS SOCRATE (Head of Technical Service, Gas Department), Société Nationale des Pétroles d'Aquitaine, France.

power stations and curiously enough by supplying the cushion gas of the Lussagnet anticline. The details of Lussagnet are of great interest to us because of the possibilities of underground storage in this country, to which Sir Harold Hartley referred recently. As an underground storage system, Lussagnet is a charmer. A tight cap rock, a thick storage stratum of high permeability and porosity, a steep sided anticline giving a concentrated layout of wells near to the gas pipelines where gas is at a pressure of the same order as that of the storage pressure which is determined by the geological factors.

The progress chart of [Fig. 14] and the gas movement

chart of [Fig. 15] are most interesting to study. In 1956 two abortive surveys were carried out elsewhere but in 1957 the first well was sunk at Lussagnet and within the same year gas was injected and even a trial withdrawal took place. Did the previous geological surveys decisively prove the presence of an anticline and locate the geological fault? If not, to fill gas into the first well shows great confidence. Perhaps, however, with natural gas available in quantities greater than can be quickly sold, one may be a bit more reckless in putting it underground. It is interesting to note also that even as the storage system was being developed gas was being injected and even a little released. This carried with it certain hazards but the No. 11 well incident does not seem to have done any harm.

Well output

The fact that the gravel packed filtering technique enabled the output per well to increase to 10 mill. cu.ft. per day, has put the withdrawal capacity higher than the gas drying capacity and higher than is needed if all wells are to be in action on a peak withdrawal day. If the authors were to redesign the system knowing that these filter techniques were so effective, would they have chosen a smaller number of wells? Incidentally the gravel packing method was greatly praised by Mr. Alexandrov when he discussed with me Russian developments in underground storage.

[Fig. 17] indicated that about one-third of the total amount of gas stored is cushion gas. If the gas were to be withdrawn for supply to a pipeline system at about one quarter the pressure of the Lacq gas pipeline, would the authors have been content to have a lower proportion of cushion gas? It is appreciated that the compressors not only compress into the anticline but they can also be used to compress the withdrawn gas into the gas pipeline.

One may be faced with the alternative of storing rich gas or town gas. Hamburg chose storage of rich refinery gas which happens to be of a composition which lends itself to reforming to town gas in continuous autothermic reformers of relatively low capital cost. Lussagnet stores in effect finished gas derived from the extensive treatment of Lacq gas and is therefore ready for further peak load distribution with no further treatment than dehydration.

There is sufficient information in the paper for us to be able to calculate the approximate costs of storage. These costs are only accepted because of the savings which result. Can the authors give some indication of their calculated costs and their estimated savings when carrying out its ultimate function?

Excellent though the translation is, there are two errors which appear to have crept in. On [p. 10], liquid methane appears to mean methane hydrate from the context. On [p. 20], permeability to water was said to be higher than permeability to gas and I think the reverse was intended.

The authors refer to the need to avoid the entrainment of piston lubrication oil with the gas stream because it fouls the porous medium in which gas is stored. They therefore chose carbon rings without lubrication but after trouble with them they are considering emulsion lubricants. Have the authors considered precision crosshead guided compressors which use neither lubricating oil nor carbon rings. Such compressors are available for higher pressures though of lower capacities and of higher capacities though at lower pressures. Between these extremes a compressor could be designed or developed to suit the needs of underground storage systems.

To gas engineers interested in underground storage, a new thinking is necessary, and we appreciate the logical account of the mechanism of injection and withdrawal; we will take heed of the authors' warning that such processes are essentially dynamic and static conceptions would be misleading.

Dr. J. Burns, Deputy Chairman, North Thames Gas Board: This is a very great success story—success of which we are, perhaps, a little envious. How very pleasant and simple it is to get raw material like natural gas available for the manufacture of town gas. It is interesting to look at this Lacq project and see what the French gas industry do with their new material. Quite clearly they were not able to displace established methods of gas manufacture by this new gas, and we find that in the first phase 40% of the new market went to the chemical industry, 30% to public supply, 15% went to motor fuel and 15% to other industries. I wonder what a similar situation would be in this country. In the first place, of course, any natural gas project, whether it be an underground gas project or whether it be to import gas, is likely to be on a very large scale, and thus one has to find a new market straight away for a very large quantity of gas.

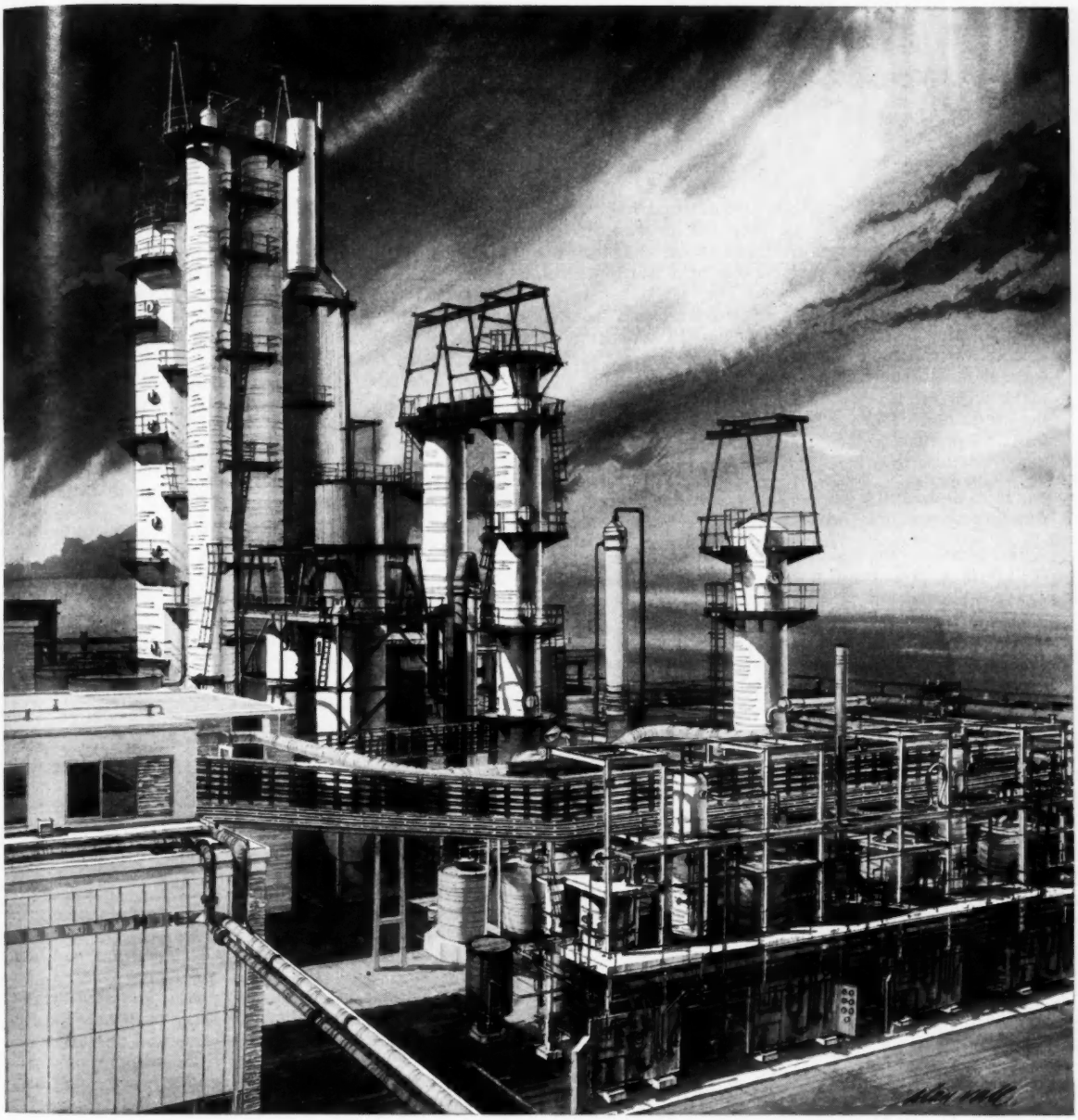
Just take a look at the chemical industry over here. The chemical industry at the present is buying oil and light spirit at approximately 5d. per therm, and I think that industry would say, despite the advantages which natural gas would give them as a raw material, that they were not prepared to pay much more than that for natural gas.

Then there is the tremendous amount of oil and coal used in the heavier industries in this country. I have in mind particularly the great cement industries in Kent and Essex where there is sufficient fuel used to keep going a large ship of liquid methane. There again this fuel has been bought by the cement industry at 5d. per therm or less, and insofar as this fuel is not necessarily required to be easily controllable, I think that the heavy industries using it would not wish to pay much more than 5d. per therm.

Marginal industries

It indicates that in this country any large inclusion of natural gas would in the first place at least have to be used to displace gas made at the present time by conventional and established methods. There are marginal industries, of course, which at the present time use oil or other fuel, which would benefit from the controllability of gas, and we can expect some inclusion of new gas there.

Our biggest difficulty lies in the summer and winter load, and it constitutes a very great problem in establishing a new supply of natural gas. If there is underground storage available that difficulty is very largely removed. Until such time, however, as that underground storage is established, what can the industry do to equate the supply of natural gas in summer time and in winter time? The obvious thing to do is to try to sell more gas in the summer



An artist's impression of the High Pressure Oil Gasification Plant nearing completion at the Isle of Grain Works of the South Eastern Gas Board

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time. This seems an extremely difficult undertaking, but there are industries which are prepared to use extra gas in the summer at low cost over and above what they use in the winter time, and there is one field which we can explore.

The other possibility lies in using a different raw material for reforming in the winter time from the summer time. One can visualise the use of natural gas both as the reforming raw material and also as the enriching raw material in the summer time, and at that same plant in the winter time using a different raw material, such as light spirit, to produce lean gas, and enriching it with natural gas to produce town gas. In that way one could in fact nearly double the output of town gas from natural gas.

Underground storage

The question of underground storage has already been dealt with by Dr. Haffner. It is something that the industry will welcome. There is still a very important question to be settled, and here I support Dr. Haffner. Do we store high B.t.u. gas or do we store town gas? I think that if you went to individual area boards you would get different answers. Nevertheless, it is something which has to be worked out for the conditions which obtain, and at the present time, without having all the facts worked out, I would say the probability is that we should store high B.t.u. gas.

Mr. J. E. Davis, O.B.E., South Eastern Gas Board: The first matter to which I would refer is that the title of this paper has a curious sound to us. We have for so long hoped that we should find natural gas and, as is well known, there has been extensive exploration by competent people looking for it and it has been disappointing. We did not think, if we were fortunate enough to find it, that there would be a major problem in disposing of it. This paper draws attention to this fact. It is not just a question of finding it, but also of disposing of it.

Although the search for natural gas has not produced very much of it in this country, it is very interesting to note the possibilities of underground storage. In that connection, the information given about Lussagnet, where the geological formation bears a curious resemblance to any one of those which we are studying in this country, is useful and encouraging. We have been advised not to consider more than 4 mill. cu.ft. per day as being likely to be produced from one particular well. The higher figures given lead to the hope that if the geological findings are confirmed, we shall be able to make better use of the work probably due to the kind of filter which has been devised.

On the matter of the cushion gas, I make the proportion even more favourable [Fig. 17] than Dr. Haffner. We were originally advised that we ought to consider a ratio of 1:1. At a later stage we felt more venturesome and we assumed a ratio of 1:2, and I think that in this diagram it is nearer 1:3, so that in thanking the authors for the information they have given us, I should like also to thank them for their encouragement in the work which we are seeking to do.

Mr. C. Johnson, Gas Council: I would like to make a few comments on that part of the paper which deals with the underground storage of gas at Lussagnet.

It will be recalled that the Aquitaine company gave this Institution a paper in May of last year which described the discovery and nature of the very large reservoir of natural gas at Lacq, the method of recovering the sulphur, petroleum, butane and propane from the gas and the transport of the saleable gas, practically pure methane, to the main centres of demand almost throughout France.

Because of the very wide disparity between summer and winter demands for gas, and the desirability of operating the system on a much better load factor than the seasonal demand would permit, the Aquitaine company began to equip an underground storage at Lussagnet, nearby, with an operational capacity which was then stated to be 17,000 mill. cu.ft. of gas, since increased to 25,000 mill. cu.ft., and a daily output rate of 35 mill. cu.ft., which it was intended to increase four or five fold in the immediate future.

In the paper before us today the authors tell us, in the first instance, that they have most successfully built up the markets for purified natural gas and that the planned rate of disposal for the immediate future is something of the order of one-third of the quantity of gas currently sold by the British gas industry. They also tell us, and this is of the greatest interest to me, that they have built, and now most successfully brought into commission, their underground storage system. The company started its tasks with the important advantage of the full resources of an experienced petroleum exploration organisation and were able to concentrate expert teams on the immediate tasks. Today's account indicates the great measure of their successes.

I would like to comment briefly on some of the work on similar lines which has been undertaken in the United Kingdom. A few years ago the Gas Council decided to investigate the prospect of finding and exploiting reserves of natural gas in this country; also the prospect of storing town gas in the reservoirs after the natural gas had been withdrawn.

The geological history of this country indicated that the high degree of faulting which had taken place over the ages would have permitted much of the natural gas to escape, so that any successful outcome of the search would probably consist of fairly moderate deposits which, even so, it was hoped would be commercially exploitable. Equally, of course, it was hoped that the reservoirs when exhausted, would be of sufficient capacity to provide useful local underground storages.

Exploitable deposits

Drillings to date have found exploitable deposits of natural gas, and several of these deposits are now being worked on a relatively modest scale. Most of the deposits are in carboniferous rocks which, because of their tight formation and varying degrees of cementation, are comparatively slow working and so unlikely to have sufficiently high gas injection and recovery rates to make successful storages.

More recently the Gas Council has concentrated its exploration work on the discovery of suitable geological structures, or aquifers, from which the reservoir water could be compressed by the storage of gas.

The most suitable reservoir rocks in this country are probably the Lower Greensands and the Triassics. The Lower

Greensands mostly occur in the south of England and the Triassics in the Midlands and the North. They appear to have good porosity and permeability and some of the anticlines seem to be covered by adequate cap rocks.

At the present time two localities are being explored, and to date the geological information, based on the drilling of 13 boreholes, indicates promising possibilities.

Calculations again based on the available information, suggest that these two storages might each be fairly similar to Lussagnet in terms of capacity, one at approximate depth 1,000 ft. and the other at 2,000 ft., and rates of gas flow have been calculated to be of a somewhat lower order than the high figures which the authors quote for the storage sands at Lussagnet. It is hoped therefore, and if all continues to go well, that we in this country will be able to emulate what has been done by our French colleagues, and which they have so kindly described to us in their most informative paper.

30% deficiency

Mr. S. L. Wright, Wales Gas Board: The paper so ably presented deals with development on a scale undreamed of except in our most optimistic moments with a 30% deficiency of energy requirements as a background on the demand side.

Then Lacq came along and this problem became one of converting this energy requirement into a demand for gas.

This problem had been faced in the development of the St. Marcet natural gas deposits in South-East France. It was indeed fortunate that this developed demand in South-East France was able to absorb 40% of the Lacq availability when the second production unit was brought into commission, a further 33⅓% of the availability being sold to the public utility Electricité de France. It appears that of this quantity of gas to be taken under contract by E.D.F. two-thirds was an alternative to coal and mixed fuel and only one-third committed to gas alone. Whether or not this was an interruptable summer time supply or not is not made clear.

The point I want to make is the diversity of utilisation and the bearing this must have upon the justification of capital expenditure upon large gas production units aimed at producing gas at costs which attract expansion of sales. It is interesting to note that the essential function of underground storage near Lacq was to ensure continuity of supplies not in the event of failure of natural gas availability but in the event of accidents in the production or treatment stations.

The analogy is the large reserve of gas storage and coal stocks that used to be held by individual industries but now considerably reduced as an economy measure and, I suggest, as a result of experience during two world wars and their subsequent industrial unrest.

It is envisaged that storage at point of production will be supplemented by other storages at the ends of main distribution lines in order to increase their annual capacity and at the same time give added security of supply to consumers. The need for storage at point of production would seem to diminish with the development of the production units, but that its initial planning at fully adequate capacity is justified by the ability it affords to operate the production units according to programme irrespective of development of demand in the early stages.

One final analogy in the form of a question to myself, and others, who plan or control grid production and compressing stations. Having planned holding storage or inlet pressures to the compressors at an economic minimum, are we content to develop district storage only as the grid is extended and demand increases?

Mr. W. R. Garrett, Northern Gas Board: It is surprising to me to note that the energy deficit in France has increased from 27.2 in 1951 to 45 mill. tons of coal equivalent in 1957. The coal deficit and the capital outlay at Lacq are the reasons given for the need to commission underground storage of gas as quickly as possible, but it is the amazing team work that lies behind the timetable given in [Fig. 14] which is to be admired.

I should like more information on how such a timetable is accomplished. In the case of underground store in the Northern Gas Board it took us double this period to install the necessary compressing machinery. Obviously our French colleagues knew precisely what they required and, what is more, where physically to acquire it. The acquisition of equipment sounds extremely simple, but I can assure you that it was not in our own case as simple as it sounds. I will quote one instance of a difficulty. It was in obtaining temperature indication some 1,300 ft. below ground. The length of the cable was such that we could not in the time available obtain a strong enough cable to carry its own weight, and finally we had to forego trying to obtain this desirable information. The answer to this of course is to prepare tentative plans before the locality is found, and I hope that those who are fortunate enough to have underground storage in their area will bear this in mind.

I note that the authors refer to the use of wireless from the well head to control. That is essential equipment and can be forgotten. I admit now that I forgot it in our case, and we had to use telephones which were a poor substitute. Fortunately, however, we only had one well head.

Measuring pressure

Can the authors enlighten me on the apparatus which apparently measures pressure at the head and at the bottom of the well? Again, why is it necessary to resort to the injection of gas into some wells while withdrawing gas from other wells? Is there any objection to sending back gas straight into the distribution system?

Mr. A. B. Densham, North Thames Gas Board: On [p. 11] the authors refer to the use of compressors with carbon rings which are not, apparently, very satisfactory, and they are trying water-soluble lubricants. Is it not possible to use some sort of filter to remove compressor oil?

On [p. 19] there is reference to the measurement of bottom temperature. Would the authors say this measurement makes it possible to detect leakages? I should be

interested to have some more information on how that is done.

I should also like to know whether there is any trace of hydrogen sulphide in the gas withdrawn. I understand that at certain locations a certain amount is formed underground. One of the theories is that it is due to the hydrolysis of sulphides which occur in the cores. If it is a thing that happens only with manufactured gas it is of importance in any decision as to whether to store imported methane, or manufactured gas. If the hydrogen sulphide is only a decomposition product of the organic sulphur contents of the newly manufactured gas, and we were to import methane and store it, there would be no need to incorporate an arrangement for removing hydrogen sulphide on the withdrawal side. I think attention has already been drawn to an error on [p. 20], where 'permeability' should read 'resistance.' On [p. 7] we talk about 'recuperation rate' of the core samples. That would be, in English, 'recovery rate.'

Mr. K. Francombe, Whessoe, Ltd.: I should like to raise a point concerning the utilisation of natural gas or methane, if we wish to obtain it in sufficient quantities to make the proposition worth while in this country. The establishment of markets on the vast scale required in the French example has presented problems which the authors have fully discussed. Also, Dr. Burns has indicated that the summer loading of imports of methane or natural gas into this country would present problems. On the initial scale—and I am thinking here of a scale involving importation by shipment, as distinct from the building of transport mains, and the enormous capital outlay involved there—it should not be very difficult to find satisfactory markets for methane. So far as one can learn, it is about twopence a therm cheaper than butane.

In addition, methane has another very important advantage. Having a calorific value of 950 to 1,000 B.t.u. per cu.ft., compared with 3,500 for butane, and a specific gravity figure of 2, when used an an enriching medium, *e.g.*, for the restoration of calorific value, it increases the specific gravity of the gas less than does butane. Consequently, the drop in the Wobbe number is less. That brings me to a theme that I mentioned recently. It seems that CO_2 removal, using such a cheap enricher as methane, is a sensible proposition, because the change in Wobbe number is so small. The cost of methane is so much less than the cost of gas to holder, and the output from a CO converter is considerably greater.

Therefore, I would have thought that methane would be an ideal enricher to go hand in hand with the reduction in CO content of town gas and that the boards as a whole, especially those making continuous vertical retort gas, and carburetted water gas, could absorb quite a large proportion of methane. This would inevitably, in the first place, be delivered to us by ship.

Education Report

17th REPORT OF THE GAS EDUCATION COMMITTEE: 1959-60

DR. A. E. HAFFNER (Chairman of the Education Committee) presented the Annual Report of the Gas Education Committee on behalf of his fellow committeemen. The Christmas lectures for young people were flourishing, but they were a fulfilment of only part of their purpose. Quite a new venture for them had been the short refresher course for engineers, which was prompted by Mr. Hutchison while he was still on the Council of the Institution. Much was learnt in this first course but another one of the same type, but with some improvements incorporated, meant for equivalent ranks of engineers in distribution or contracting firms would take place April 9—15, 1961.

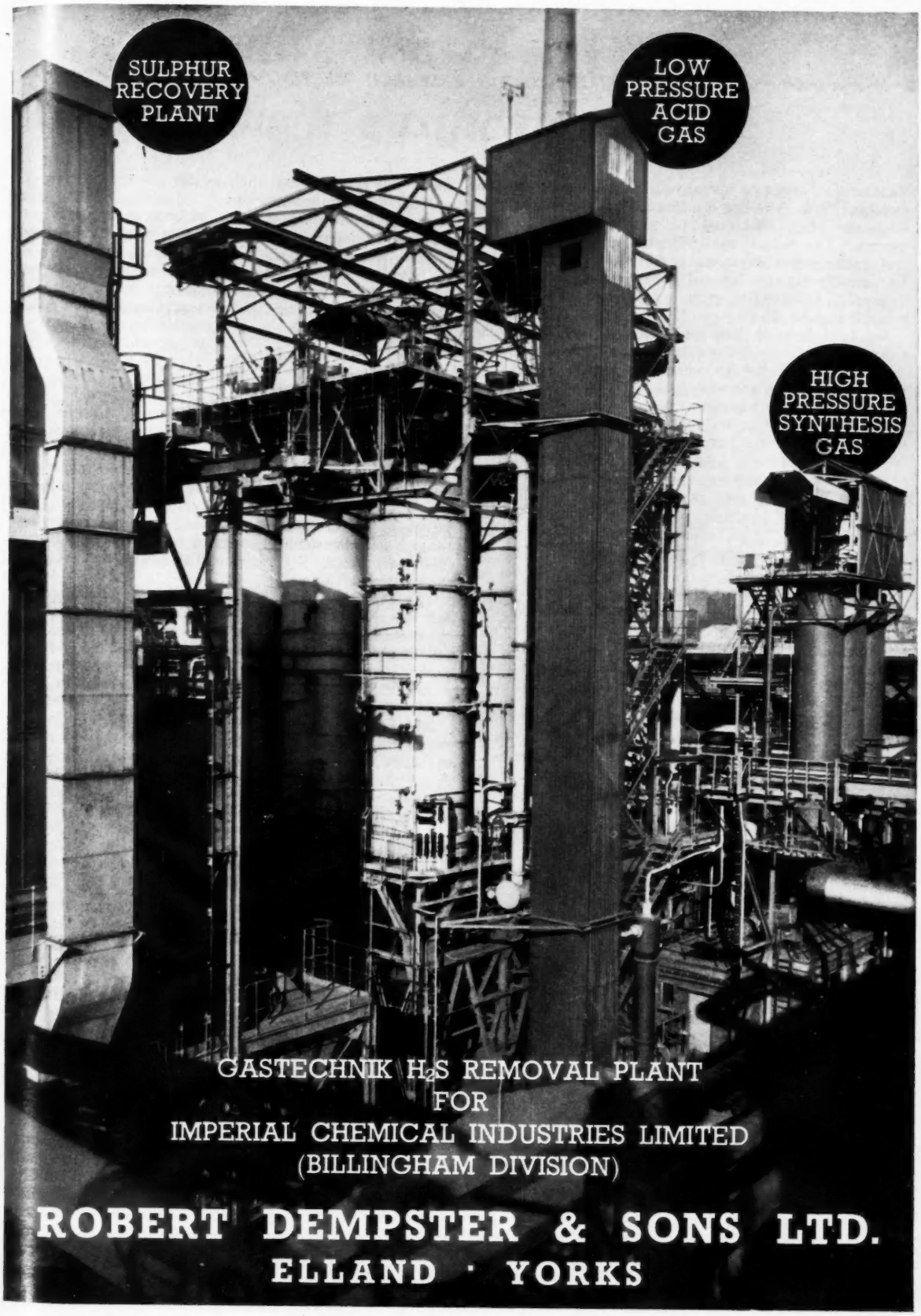
The Short Course for teachers of gas fitting, held at Southampton, had novel features because of the impact of the new City and Guilds syllabus and the pioneer work of Southampton Technical College in teaching craft science. There should be a similar course for teachers in gas technology in 1961.

Sandwich courses at Salford, Birmingham, Enfield and Westminster and a similar course at Heriot Watt College, Edinburgh, continued to be important for the flow of students who in all the three years combined numbered about 160.

During 1960 it was possible again under the Woodall Duckham Education Fund to send two young engineers, Mr. Scott and Mr. Yates, to attend two Summer Courses at the Institute of Gas Technology, Chicago.

The Allens Course for engineers, which was now in operation at Bedford to the benefit of six young engineers from the gas industry, was on a modest scale but its cumulative effect must have led to a greater appreciation of the fine machines made by British engineering firms.

The revised syllabus for the Associate Membership


SULPHUR RECOVERY PLANT
LOW PRESSURE ACID GAS
HIGH PRESSURE SYNTHESIS GAS
GASTECHNIK H_2S REMOVAL PLANT
FOR
IMPERIAL CHEMICAL INDUSTRIES LIMITED
(BILLINGHAM DIVISION)
ROBERT DEMPSTER & SONS LTD.
ELLAND · YORKS

Examination would be operative from the Examination in October, 1962. The last examination on the old syllabus would be May, 1962, and the two systems would not overlap. The Associate Membership Examination in the first and/or second Paper was undertaken by 58 candidates. The numbers taking Internal Examination by Sandwich Courses at Salford, Birmingham and Heriot Watt College numbered about 40.

Mr. L. F. Randall (East Midlands Gas Board) said that although there was a slight reduction in the number of candidates who sat for the written examination in the Certificate of Gas Salesmanship and Consumer Service, the standard of the candidates was found to be higher than in previous years. The only disturbing feature was that the number of young men studying under the Institution scheme appeared to be extremely small in relation to the requirements of the industry as a whole.

New syllabus

The Report referred to the new syllabus which would be used for future examinations and the fact that these syllabuses integrated for the first time with the main subject the necessary ancillary subjects, such as mathematics, engineering science and engineering drawing. His Committee considered that to be effective in his job as a salesman the candidate should reach a desired standard of literacy and should be able to express himself precisely and adequately.

Mr. J. Maitland-Edwards (H.M. Inspector of Technical Education) said that he was glad to see the attention which had been paid by the Institution and other professional bodies to prepare for the young people coming out in the mid-1960's into professional training. He thought it was up to all of them to see that the valuable raw material coming forward in the 1960's was stimulated and not quenched.

At Southampton much of the valuable work which had been performed by the Southampton Technical College was not fully comprehended by the teachers. They gathered very much, but nevertheless, after the course, they would not have been able to teach science reliably in gas fitting instruction. This was in no way a criticism, but is merely the statement of a fact.

Science presentation

While in the coming summer they were not proposing a course for teachers of gas fitting, they had in mind for future years further courses which would enable the teachers of gas fitting to bring themselves up to date with the presentation of science in their courses.

A further aspect of teacher training which was concerning them at present was the need to keep teachers fully up to date with the technological situation and with trends in industry.

Mr. F. Grocott (Board of Examiners) asked, how often was a student treated as a holiday relief or as a means of mitigating temporary or even permanent shortages of staff? How often was a student given routine work which left little time for widening his practical knowledge? There was evidence that students did not keep abreast of modern developments.

Mr. A. D. Graham (Deputy Director of the City and Guilds of London Institute) said that the Manufacture Practice and Distribution Practice schemes, which were in an advanced state of preparation, and the Utilisation scheme, represented in total what was hoped to be a realistic revision of the syllabuses in Gas Technology at sub-professional levels.

New proposals

The new proposals were that there should be three lots of examinations: (i) In Gas Technology (Manufacture), (ii) Gas Technology (Distribution), and (iii) Gas Technology (Utilisation) in an attempt to make the courses far more in keeping with current needs within the industry.

Mr. A. F. Grant remarked that there appeared to be an increasing proportion of members of the Institution coming through qualification by a sandwich course, and he thought this was probably a tendency which would accelerate in the very near future.

The main problem of the assessor at the present time was that the amount of knowledge acquired on all subjects in the present intensive and few short periods at College was inadequate. The presentation and content of the work in examination scripts was immature and the assessor found it difficult it determine whether a candidate would ultimately develop into a capable engineer.

Nevertheless, there had been material improvement in the existing sandwich courses arising from the efforts of the staffs of the colleges and from their very willing co-operation with the personnel of area boards and the Assessors in reviewing both the theoretical and practical aspects of the courses.

Mentors

Mr. Grant drew attention to the care that is required to be given to the means of introducing a student straight from school into the industrial atmosphere, particularly of a works. He suggested a laboratory or a drawing office. The other point was the proposal that students should be under the care of what for want of a different expression were called mentors, who would watch their practical training, assist them in their difficulties and check their logbooks. That, again, could be worked out locally.

Mr. Hill (Education and Training Officer, Southern Gas Board) said that participation was a good thing in training and the idea of introducing an air of realism through practical sessions was wholly praiseworthy.

The ratio of part-time to full-time teachers throughout the industry stood at 2 to 1. Although this ratio had improved from 3 to 1 since 1958, the time had now surely come when they could all rationalise their gas fititng training and, as a result, employ full-time instructors or, better still, get the Technical Colleges to do it for them. Professionalism and expertise in training, as in most things, was a desirable thing to go for.

The effective use of coal through gasification

by ARIMASA BABA, Director, Resources Research Institute, Agency of Industrial Science and Technology, Japan

THE energy resources of Japan are very poor, amounting to not more than 1% of the world reserve. Among them hydraulic power heads the list representing 54%, followed by coal with 40% and wood and charcoal 5%, other items being almost negligible.

The emphasis, therefore, is to be laid upon coal as an important indigenous source of energy, while the world wide tendency of switching from solid to liquid fuel is at present very prevalent in Japan.

Coal strata in Japan are not usually even resembling, in a sense, those of Europe. Moreover, coal basins consist of strata, few in number with fairly wide intervals. Most of the coals belong to the tertiary period, but coalification has been prompted by geophysical and volcanic actions to convert most of them into bituminous varieties. The surface of the basins is mountainous, divided into many narrow valleys, and groups of mines are generally intermingled. These conditions make it rather difficult to construct ample surface equipments which are necessary for modern mining, and here is the great difference from the conditions in European coal mines.

Coal distribution

Japanese coalfields are distributed on the four main islands of the Japanese Archipelago extending 2,000 km. in the northernmost island, Hokkaido, the eastern and western coasts of Honshu, and the northern part of the southernmost, Kyushu. About 50% of the reserves are concentrated in Hokkaido, and about 40% in Kyushu. Of the annual production of 45 to 50 mill. tons, 31% is produced in Hokkaido and 53% in Kyushu. The principal coal-consuming centres, however, are located in the central part of Honshu, such as Tokyo, Nagoya, and Osaka.

The following are the chief differences between the coal industries of Japan, and those of Europe and America:

1. Japanese coals rank between lignite and anthracite, and are mostly young. The production of coking coal is less than 20% of the total, the majority or 75% being non-coking coal, or boiler coal. The ash content of run-of-mine coals may be as high as 30%, and there is usually a large discharge of waste from the washeries.

2. There are no coal mines in Japan producing more than 5,000 tons of coal a day, as are to be found in the Ruhr district of West Germany or Lorraine in France. The largest in Japan are of the order of 3,000 tons a day, and are widely scattered. There are no collieries in which surface plants such as power plants, coke oven plants, and chemical plants form an integral part of the undertaking. These surface plants usually belong to other industrial concerns, while the colliery power plants serve only as auxiliary units.

3. Since the transportation distances from coalfields to the consuming centres, by both sea and land, are long, reaching more than 1,000 km. at maximum, freight costs usually account for no less than one third of the production costs of coal. When coals of 7,500 and 5,500 kcal per kg. are compared with fuel oil of 10.000 kcal per kg., their poor quality related to price per kcal. amounts to 20%, 23%, and 27% respectively. Consequently, their competition with other sources of energy in the energy-consuming centres in the mid-Honshu areas is far keener than in Hokkaido or Kyushu.

4. Coking coal of Japan is such that it is not suitable for producing good metallurgical coke without blending. Coking plants are usually attached to blast furnaces located on the sea coast, and the metallurgical coke is made from high volatile native coal blended with imported strongly-caking coal of low volatile content. Town gas is mostly manufactured from high volatile coking coal mined at colleries far distant from the carbonising sites. The long-distance transmission network for town gas, which is popular in Europe, has not yet been realised in Japan.

Experiments are being carried out at the Resources Research Institute to overcome these difficulties.

Owing to long transportation, coal cleaning must be intensified at the source in order to save the cost of transportation and to utilise the coal most efficiently. Washery wastes are usually composed of more than 70% ash, though they may still contain some combustible matter, the calorific value of which corresponds to 12 to 17% of the total potential heat of the mined coal. If this amount of energy could be converted into electric power, it would significantly influence the economy of the colliery.

For example, there is already a power station installed in the Joban coal district, 200 km. north of Tokyo, which burns recovered wastes of 3,500 kcal per kg., and generates 75,000 kW. of electricity. It will be increased to 150,000 kW next year, and to 300,000 kW. in the near future. The most effective way of utilising the wastes seems to be to convert them into electric power. In Japan, the calorific value of wastes from a washery is 2,000 kcal per kg. on the average. Low calorific wastes have been successfully burnt at a combustion rate of 600,000 kcal. per sq.in. per hour. Costs of drying and pulverising, however, are comparatively high, and difficulties from ash have often been encountered.

On the other hand, gasification of wastes in a fluidised bed is being studied, by which it is designed to minimise the loss due to drying and pulverising, and to avoid ash troubles by directly burning the gas produced in a combustion chamber.

The gasifier is cone-shaped to enable it to treat a wide range of fuel sizes. Some fine ash may enter the combustion chamber, but it will probably not exceed that from pulverised coal firing practised in ordinary power plant boilers in Japan.

The results to be expected are shown in Table 1.

TABLE 1.
Gas Produced

Constituent	%
CO_2	13·0
CmHn	—
CO	12·0
CH_4	1·5
H_2	9·0
O_2	0·5
N_2	64·0

Calorific value	780 kcal/m³
Gasification rate	570 kg/m²/hr.
Hot efficiency	62%
Volume of gas per kg. of any coal	1·62m³

Coal Used

Proximate analysis	%
Moisture	3·84
Ash	60·44
Volatile Matter	21·37
Fixed Carbon	14·35
Size (mm.)	30
Calorific value (kcal/kg)	2·600

The dimensions and other particulars of the experimental gasifier were:

Inner diameter,	1,000 mm.
Height,	4,000 mm.
Temperature of fluidised bed,	1,100°C.
Coal feed,	450 kg per hour.
Volume of gas made,	700 cu. m. per hour.

For the utilisation of coal as a source of energy, it is most desirable to convert it to the form of electric power for transmission, but for heating purposes, it is advantageous to convert coal into gas of high calorific value before it is transmitted.

For instance the cost per kcal for a coal of 5,600 kcal/kg in the eastern Honshu coalfield about 200 km from Tokyo, when transported by rail to Tokyo, is increased by 15%. If, on the other hand, it were first converted into gas of 4,000 kcal per cu. m. and transmitted to Tokyo by a pipeline, the cost increase per kcal would be less than 13%, since the evaluation of gas is twice as much as that of coal on a thermal basis, and its efficiency in use is much higher. The actual costs, however, of gasification and transmission may amount to 38%.

In Europe, coke oven gas is transmitted by long-distance pipeline networks. In Japan, most coal being young, it is unsuitable for producing gas of high calorific value in coke ovens. It becomes necessary therefore to develop a process of producing gas of high calorific value from a non-coking friable coal. For this purpose, a study has already been made for manufacturing a gas of high calorific value by fluidised bed carbonisation—reported at the previous Sectional Meeting in Montreal.

The present paper is a report on the latest development of the process of gasification under pressure which is being carried out in Japan. As is well known, fixed bed gasification under pressure was developed by Lurgi Gesellschaft für Wärmetechnik. In the Japanese process, gasification is performed on a fluidised bed, taking into consideration the fact that the Japanese coal is generally young. Satisfactory results have been obtained in experiments under pressure of 5 kg. per sq. cm.

The working results of raw coal gasification on the fluidised bed under pressure are shown in Table 2.

TABLE 2.
Gas Produced

Constituent	%
CO_2	31·0
CmHn	1·2
CO	19·3
CH_4	9·9
H_2	35·5
O_2	·4
N_2	2·7

Calorific value of purified gas	3,960 kcal/m³
Gasification rate	830 kg/m²/hr.
Cold efficiency per kg of dry coal	75%
Oxygen supply	·49m³
Steam supply	2·2 kg.
Gas produced	1·80 m³

Coal Used

Proximate analysis	%
Moisture	3·84
Ash	60·44
Volatile matter	21·37
Fixed Carbon	14·35
Size (mm.)	30
Calorific value (kcal/kg)	2,600

The most important particulars of this second experimental gasifier were:

Inner diameter	150 mm.
Height	1,200 mm.
Working pressure (gauge)	5 kg./sq.cm.
Temperature of fluidised bed	900°C.
Coal feed	14.3 kg./hr.
Oxygen supply	8.2 m³/hr.
Steam supply	32.0 kg./hr.
Gas made	25.9 m³/hr.

Standard for testing superheated steam

THE more general use of boilers operating at higher pressure has created a need for the standardisation of sampling and testing methods for superheated steam, since the purity of the steam cannot always be accurately predicted from the composition of the water from which it is generated.

In the preparation of this new British Standard (B.S.3285) it has been thought desirable to give the best possible—and, therefore, frequently the most difficult—techniques.

The publication is complementary to Addendum One of B.S.2690, 'Methods of testing water used in industry', which was specifically prepared for the analysis of high purity water. (This addendum will be published within the next month).

The new publication states requirements for apparatus and for procedure for obtaining a representative sample of superheated steam flowing in a pipe or pipes. It also covers the extraction and processing of the sample, for delivery to measuring and analytical devices suitable for continuous field testing or for delivery to a container in which the sample may be preserved for subsequent laboratory investigation.

Copies of this standard may be obtained from the British Standards Institution, Sales Branch, 2 Park Street, London, W.1., price 7s. 6d.

Technical developments

Centrifugal pumps

RHODES, BRYDON & YOUATT LTD., of Stockport, manufacturers of centrifugal pumps with the trade mark 'Mopump,' have made another addition to their standard range of products. It is the 'SC' Mopump and is intended for boiler feed and similar duties. The primary purpose of this new pump is to meet the demand created by the popularity of the 'package' boilers.

For small installations where the rate of flow is low, conventional multi-stage centrifugal pumps are not usually an economic proposition due to a low efficiency at the duty point and the higher cost of manufacture. The 'SC' Mopump is designed specifically for these duties and is a development of the small high pressure pumps which the company has been manufacturing for many years. The result is a range of pumps with a better performance and lower price.

One of the main features of the 'SC' Mopump is its robustness, incorporating the well known arrangement of unit construction. This has created a compact unit capable of generating a high head while delivering a small quantity of liquid.

The internal design of the 'SC' Mopump can be described as the side channel regenerative type. Particles of liquid leave and re-enter the space between the rotor blades several times before leaving the pump casing. The energy imparted to the liquid in the form of pressure is correspondingly greater than that generated by a conventional unit with a similar size impeller at the same speed.

The use of unit construction permits easy dismantling of the pump components. Only one mechanical seal is fitted, a Crane type 2 with ESN seat, situated at the low

An 'SC' Mopump

pressure end of the pump. This incorporates an extended surface seat allowing maximum heat dissipation from the sealing faces and enables the pumps to be used for liquids up to 200°F.

Normally the pumps are supplied with vertical branches in a common direction, but three alternative positions with four branches are available.

The 'SC' Mopump is manufactured with 1-in., 1½-in., 1½-in. and 2-in. bore branches in single-stage and two-stage units. Without deviating from a standard construction any make of drip proof motor or totally enclosed motor of British Standard frame size and suitable shaft extension may be fitted.—*Rhodes, Brydon & Youatt Ltd.*

Improved siphon emptier

A SIPHON-EMPTYING tank lorry, embodying an improved pumping system based on the use of a Megator M16 pump, has recently been produced by Allan Taylor (Engineers) Ltd. The new vehicle incorporates many refinements designed for easier and more economic operation, and represents a considerable advance over earlier types which employed centrifugal pumps driven directly from the vehicle gearbox.

The new siphon emptier is built on a standard Ford Thames 3-ton 4D chassis with cab, and carries a 600-gal. tank, galvanised inside and outside. The pump set is

The Allan Taylor siphon-emptying tank lorry

installed between the tank and the cab and consists of a Petter PAZ 1 diesel engine connected through a shaft to a Megator M16 pump supplied by Megator Pumps and Compressors Ltd.

This system permits easier attention to both pump and engine, for both are in a very accessible position, and also uses less fuel than if the pump had been driven by the vehicle engine. It also reduces wear on the vehicle engine and gearbox.

The Megator pump was chosen, in place of the earlier centrifugal pump, because it is self-priming, and is sufficiently robust to withstand the rigours of this type of operation. The pump is simply constructed, requiring a minimum of skilled maintenance, and no special training is needed by the operator.

The vehicle is equipped with a 25-ft. length of 1½-inch flexible wirebound hose, one end of which is attached to the siphon outlet, and the other end to a metal connector at the back of the lorry. This leads into a Monel gauze filter, of special easy-clean design, and the condensate passes through this filter, a sight-glass, and a stopcock, then along a pipe to the pump and into the top of the tank.

A glass tube fitted to the end of the tank provides a visual indication of the water level. The air-vent on the top of the tank is fitted with a T-bend carrying two Amal flame traps.

The tank is fitted to the chassis at a 1-in-20 gradient

to facilitate drainage, and the contents are emptied through a 3-in. drain at the lowest part of the tank. Periodic removal of sludge is carried out through an access door at the rear of the tank.—*Allan Taylor (Engineers) Ltd.*

Air-operated solenoid valve

ETHER LTD. have introduced air-operated solenoid-controlled valves Series A.S.V. as an addition to their range of solenoid-operated valves. Until recently, they were limited to 1-in. size, but design and development have now been completed to extend the range up to 3-in. Illustrated is a 2-in. valve.

The compressed-air supply is controlled by a small three-way solenoid valve mounted as an integral part of the main valve. When the solenoid is energised, air is admitted to a piston chamber, and the piston then moves the main valve into the open position. When the solenoid is de-energised, the compressed-air supply is shut off and the pressure between the main valve and the solenoid valve is exhausted to atmosphere, the main valve then closes under spring pressure.

An Ether air-operated solenoid valve

These air-operated valves are built to meet specific applications and are particularly suitable, owing to the few moving parts in the main flow line, for the control of high-viscosity fluids. They are also suitable for the control of low-viscosity liquids and gases under pressure or vacuum. —*Ether Ltd., Solenoid Valve Division.*

Stop valve for cold fluid

A SPECIAL adaptation of a standard valve to give a tight shut-off and to isolate the packing from the proximity of very cold fluids, has been announced by Hunt and Mitton Ltd.

It is the 'F' type bronze globe pattern hand-wheel operated stop valve, and it has a special heat transfer gland. It was adapted for use in the manufacture of ethylene gas, and it overcomes difficulties which arise in the gland when in contact with cold fluids. The special gland fitted to the valve enables it to obtain heat from the atmosphere, which maintains the gland at a normal temperature. It also gives a very tight shut-off.

The valve can be supplied in sizes ½-in. up to 3-in. The body and head are of bronze, the handwheel of cast-iron, the valve seat and block of Nickloy, the spindle of stainless steel.—*Hunt and Mitton Ltd.*

Trade Publications

A BOOKLET from Head, Wrightson and Co Ltd. entitled 'Demineralisation Plant' gives a brief description of the processes the Company offers in the field of water demineralisation and a general guidance to the application of each process.—*Head, Wrightson and Co. Ltd.*

Two catalogues have ben published for Pilot Works Ltd., containing details of both sections of this company's activities. That on 'Hydraulic Tipping Gear' includes the body-work capacity calculator, and material weights and measurements chart. The 'Press and Croppers' brochure give all relevant information on this subject.—*Pilot Works Ltd.*

Chemical Engineering Wiltons Ltd. have prepared a leaflet entitled 'Lurgi Supersorbon Solvent Recovery Plants'. It details the method of operation, the advantages and economy of the process, as well as considering the fully automatic plant and the continuous automatic plant.—*Chemical Engineering Wiltons Ltd.*

Solus Schall Ltd. has produced a booklet reviewing site methods of non-destructive testing, including visual welding inspection, X-radiography, gamma radiography, penetrants, ultrasonic flaw detection and magnetic particle inspection.—*Solus-Schall Ltd.*

Publication No. 200 'Holdan Materials Handling Plant' briefly describes the range of plant manufactured by this associate company of W. C. Holmes and Co. Ltd.—*Holdan Engineers (London) Ltd.*

A catalogue entitled 'Argus Packings and Jointings' gives detailed information and guidance on the proper selection of packings and jointings for individual needs. The range of Argus products of this type is listed in full.—*George Argus and Co. Ltd.*

Joseph Crosfield and Sons Ltd., have issued the first of a new series of six monthly booklets entitled 'Development Products'. It is intended to give details of new products, together with suggested applications for their use.—*Joseph Crosfield and Sons Ltd.*

'The Otto Continuous Catalytic Reforming Process for Production of Town's Gas from Hydrocarbons' is the subject of the latest publication from Simon-Carves Ltd. The process upon which the plant works is described, as well as its operation; figures of its operating efficiency are also provided.—*Simon-Carves Ltd.*

Trend towards peak load says S.E.G.B. Chairman

DESCRIBING 1959-60 as a year of paradoxes in that the South Eastern Gas Board had a deficit of £1.3 mill. despite the fact that it had a record year in cooker, room heater and central heating sales, Mr. R. N. Bruce, the Chairman, told the Board's Gas Consultative Council last week that with the introduction of new load building appliances there must be a change in the pattern of gas production from base-load to peak-load. This was one of the reasons why they were installing butane plants at some of their major works.

The greater use of light gasworks feedstocks at some of the Board's water gas plants, had given more flexibility to the processes they could use, and had had an effect on the control of coke stocks.

Mr. Bruce said that it would be an enormous advantage to the Board if they could even out their load on the production stations through the year. They were therefore very interested in finding geological structures to contain very large quantities of gas under pressure. Said Mr. Bruce, 'If these become available, and I have some strong hopes that they may do, it would be possible for our major plants to be worked at high load factors of over 90% instead of at the present time nearer to 60% to 70%.'

There were definite trends to show that their new gasmaking processes were beginning to take their place in the pattern of gas production at a lower price. The coke situation was under control with the growing demand in the domestic field, sales of appliances were increasing and would no doubt increase further.

If there could be more stability in the fields of raw materials and wages, they could then see a prosperous future, and continue to provide a service to the public at a reasonable cost, and put to reserve reasonable sums for the difficult periods.

New plant contract

A CONTRACT to supply a complete gas cleaning plant has been awarded to Chemical Construction (G.B.) Ltd. by Gutehoffnungshutte (GHH). The plant is to be used in conjunction with the oxygen steelmaking rotor furnace GHH are supplying to Richard Thomas & Baldwins at their Redbourn Works in Scunthorpe, Lincs.

This is the first application of the Chemico P.A. Venturi Scrubber in the United Kingdom for the elimination of iron oxide fumes from an oxygen steelmaking plant.

The gas cleaning plant will handle 106,000 cu.ft. per minute of saturated gas and includes a filtration plant for the removal of solids from the scrubbing water. It is expected the installation will be in operation early in 1961.

WELDING COURSES

The School of Welding Technology is organising further evening courses in Birmingham and Manchester in the Spring of next year for designers and draughtsmen. The subject of the Birmingham course will be 'Detail Design of Welded Structural Steelwork', and that in Manchester, 'Design for Welding in Heavy Engineering'.

Scots disagree on smokeless fuel supplies

DISPUTE has arisen in Scotland over a smokeless zone order, because about 500 householders from Pollokshields have objected to their district becoming a smokeless zone late next year.

The householders say that supplies of smokeless fuel will be inadequate, and quote the Peech Committee, which indicated that only very limited supplies would be available in Scotland during the next five years.

Mr. W. J. Rawlings, Coke Marketing Officer of the Scottish Gas Board, speaking at the public enquiry in Glasgow, said that he did not foresee any shortage in the present five year plan, but a shortage could happen if plans were carried out covering the whole country.

NEWS SUPPLEMENT

Whessoe gets contract of £A200,000

WHESSOE LTD. have been awarded a contract worth £A200,000 by the Gas and Fuel Corporation of Victoria. The contract covers the design, supply and erection of a set of mild steel purifier boxes with a capacity of 10 mill. cu.ft. a day, for the West Melbourne gasworks.

The set will consist of five boxes which will be supported on an elevated structure built in as an integral part of the boxes. The plant will be complete with all ancillary gear, including provision of mechanical means of charging and discharging the oxide, and power operated valves to give rapid automatic rotation.

Engineering design and drawing will be carried out at Whessoe's Darlington office, the contract as a whole being organised in conjunction with Norman J. Hurll and Co. (Victoria) Pty. Ltd., of Melbourne, who are associated with Whessoe for work in Australia and New Zealand. Most of the fabrication will be done in Australia.

Coke oven contract

GIBBONS BROTHERS, a member of the Wellington Tube Holdings group, has received a contract worth about £2.7 mill. from the South Durham Steel and Iron Company.

It is for the supply and erection of a coke oven installation at the Cargo Fleet works of South Durham Steel. The contract involves 60 ovens, coal and coke handling and by-product manufacturing plant.

Now Glover and Main take over Benhams

GLOVER AND MAIN have acquired the whole of the ordinary share capital of Benham and Sons. This increases their interest in the catering equipment field to a very considerable extent.

Benhams have been established for over 150 years and are a famous company in the field of complete kitchen planning and installation in this country. They are also well known for their heating and air conditioning plant.

It is the intention for Benhams, and James Stott and Company (also recently taken over) to preserve their separate identities and to continue to trade independently and competitively, as they have in the past, with their own planning and sales staffs. The four exetive directors of Benhams, Mr. J. E. Benham, Mr. C. S. K. Benham, Mr. J. C. Morris and Mr. E. H. Barton will remain on the Board.

BRITISH TAR CONFEDERATION OFFICERS FOR 1960-61

AT the recent annual general meeting of the British Tar Confederation Mr. C. Lord (Chairman, Lancashire Tar Distillers Ltd.) was elected President for 1960-61. He will also be Chairman of the Executive Board.

Mr. L. W. Blundell (Controller of By-Products, North Thames Gas Board), is honorary treasurer, and the Vice-Chairmen of the Executive Board are Mr. W. K. Hutchison, C.B.E. (Deputy Chairman, Gas Council) and Mr. C. M. Frith (The South Yorkshire Chemical Works Ltd.).

The Executive Board consists of ten representatives nominated by each of the Association of Tar Distillers, the British Coking Industry Association and the Gas Council, and one representative nominated by the Low Temperature Coal Distillers Association of Great Britain Ltd.

The following constitute the Board for the year 1960-61 :—

Representing the Association of Tar Distillers:—**Mr. L. W. Blundell, North Thames Gas Board; Mr. E. P. Butler, Bristol & West Tar Distillers Ltd.; Mr. C. E. Carey, South Eastern Gas Board; Mr. E. Hardman, E. Hardman, Son & Co. Ltd.; Mr. R. T. Hayes, United Coke & Chemicals Co., Ltd.; Mr. T. L. Kinton, Printar Industries, Ltd.; Mr. M. J. R. Lane, Normanby Park Tar Supply Co. Ltd.; Mr. C. Lord, Lancashire Tar Distillers Ltd.; Mr. R. B. Robinson, Midland Tar Distillers Ltd.; Mr. C. J. Waller, Scottish Tar Distillers Ltd.**

Representing the British Coking Industry Association:—**Lt.-Col. P. F. Benton-Jones, O.B.E., United Coke & Chemicals Co. Ltd.; Mr. A. Bradley, National Coal Board; Mr. T. R. Craig, O.B.E., Colvilles Ltd.; Mr. J. Y. Feggetter, National Coal Board (Durham Division); Mr. C. M. Frith, South Yorkshire Chemical Works Ltd.; Mr. I. Hall, National Coal Board (North Eastern Division); Mr. G. Hanna, Dorman Long (Chemicals) Ltd., Dr. W. E. Harris, National Coal Board (South Western Division); Mr. W. D. Holt, National Coal Board (East Midlands Division); Mr. A. Slater, Staveley Iron & Chemical Co. Ltd.**

Representing the Gas Council:—**Mr. S. Black, M.B.E., Northern Gas Board; Mr. R. N. Bruce, O.B.E., South Eastern Gas Board; Dr. J. Burns, G.M., North Thames and Eastern Gas Boards; Mr. J. Carr, O.B.E., M.C., Southern and South Western Gas Boards; Mr. E. H. Harman, East and West Midlands Gas Boards; Mr. W. Hodkinson, O.B.E., North Western Gas Board; Mr. W. K. Hutchison, C.B.E., Gas Council; Mr. A. McDonald, North Eastern Gas Board; Mr. J. Powdrill, M.B.E., Wales Gas Board; Mr. Sydney Smith, C.B.E., Scottish Gas Board.**

Weekly statistics

TOTAL available gas at gasworks during the week ended November 27, 1960 was 61.7 mill. therms. Coal consumed by the gas industry for the week ended November 26, 1960 was 471,000 tons, and by coke ovens, 571,000 tons. Stocks of coal held during the same week by the gas industry stood at 2.08 mill. tons, and by coke ovens, at 1.606 mill. tons.

CUTLERS THE NAME WITH A GREAT REPUTATION

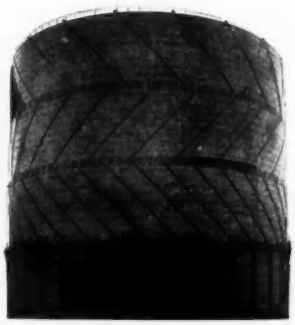
IN THE GAS INDUSTRY, BASED ON 120 YEARS' EXPERIENCE IN THE MANUFACTURE AND ERECTION OF ALL TYPES OF GASWORKS PLANT

GASHOLDERS

PURIFIERS

CONDENSERS

HANDLING PLANT



STEEL MAINS

STEEL TANKS

GENERAL CONSTRUCTIONAL STEELWORK

SAML. CUTLER & SONS LTD.

PROVIDENCE IRON WORKS, **LONDON** MILLWALL, E.14.

FORDS WILL USE TOWN GAS FOR PROCESS HEAT AT GIANT NEW FACTORY

THE Ford Motor Company has entered into an agreement with the North Western Gas Board to take up to 2¾ mill. therms of gas a year for use, in the first place, mainly in ovens for painting car bodies, and later for other processes at their giant new factory, now under construction at Halewood, near Speke, Liverpool.

The agreement was negotiated with Fords by Mr. Colin Smettem, Commercial Manager of the Board's Mersey Group, supported by Mr. H. C. Elles, the Industrial Sales Officer. There was strong competition from butane.

It is expected that Fords' new factory will come into production and the supply of gas commence in 1962. The gas load will be the second largest in the Mersey Group area and the ninth largest in the north-west.

To supply it a special main is to be laid from the nearest part of the Mersey grid main to the factory. Most of the gas will come from the Board's Garston works.

At the new factory, which will cover some 320 acres, passenger car bodies will be manufactured, and with other components supplied from Dagenham and elsewhere, cars will be assembled ready for delivery. The new factory will employ some 8,000 people.

Australian gas industry shows steady advance

THE Australian gas industry showed a steady advance during the year ended December 31, 1959, with a further increase of 2% in gas sent-out. The total gas sent-out for the year was 248,955 mill. therms. The rated daily capacity of the industry now stands at 1.010 mill. therms.

Gas produced from black coal in the capital cities represented 52.75% of the total gas sent-out, against 53.6% in 1958, while gas purchased from refineries was 19.95% compared with 19.2% in the previous year. In the provincial areas coal gas fell 1.2% to 97.4% of the gas sent-out, while water gas rose by 1% to 1.7%.

Gas sales showed an increase of 2.9% but coke sales continued to fall and closed 2.1% down. The net revenue from gas showed an increase of 4.8% while that from by-product sales decreased by 6.6%; sales of appliances increased by 5.5%. The total turnover was £A45.765 mill., an increase of 3.4% on the figure for 1958.

Industrial sales rose by 5.9%, commercial by 2.7% and domestic by 2.3%. Consumption per meter continued to increase and closed at 173 therms in the capital cities and 135 therms in other areas.

Trout fatality: Scottish Board sends regrets

THE Scottish Gas Board has written to the Tay River Purification Board regretting the pollution of the upper reaches of the River Eden last August. The pollution was stated to have been caused by the dismantling of the disused Strathmiglo gasworks.

It was reported at a meeting of the Purification Board that the Scottish Gas Board had given an assurance that every step would be taken to ensure that there was no pollution of rivers as a result of the future operations of the Board, which has also undertaken to consult representatives of local authorities in future regarding the manner in which liquid might be disposed of.

In reply to a question on the restocking of the polluted river, the Gas Board said that in the event of any claim being made against the Board, this would be immediately forwarded to the insurance company for their attention.

Parkinson Cowan divisions merge

UNIFICATION of two of Parkinson Cowan's operating divisions, Parkinson Cowan Instruments and Measurement Ltd., has been announced by the Chairman, Mr. H. P. Barker. The change has been made for the purpose of allowing marketing efforts to be further concentrated.

The new division is known as Parkinson Cowan Measurement, and is headed by Mr. C. H. Chambers, previously divisional manager of Parkinson Cowan Instruments.

MORE SPACE

Abbott, Birks and Co. Ltd., have opened an extension to their building in Blackfriars Road, which will give them nearly 50% more warehouse, workshop and office space.

JERSEY RAISES GAS PRICES

THE Jersey Gas Light Co. Ltd. has warned its consumers that because of increased costs the price per therm of gas in the island will be increased from the next meter readings.

Under the new price structure consumers using up to 125 therms per quarter will pay a basic price of 27d. per therm. A scale of rebates of from 1d. to 6.5d. therm will be made to consumers using above this total up to 5,000 therms a quarter. For consumption above 5,000 therms per quarter the price will be 20d. therm, falling to 17.5d. therm for users consuming over 20,000 therms per quarter. On domestic optional two part tariffs the standing charge will be 25s. a quarter with gas at 21.5d. therm. Meter rental charges will be 5s. a quarter.

Consumers of gas for commercial or industrial purposes will be told later what their revised charges will be.

New North Western Board news-sheet

THE first issue of a news-sheet devoted to industrial uses of gas and intended for circulation among industrialists and heads of large businesses in the North West has been published by the North Western Gas Board.

The new publication, called 'Piped Heat', and believed to be the first of its kind ever produced within the gas industry, sets out to describe briefly and in non-technical language in each issue three or four interesting new applications of gas in industry or big business.

The first issue has articles on the largest gas-radiant heating system in the world at Cammell-Lairds, new metal finishing processes by gas, new designs for the gas user, and annealing with superfast cooling. The descriptions are just long enough to give a busy managing director or executive a picture of the essential features of the application described.

'Piped Heat' can be read from beginning to end in 5 minutes and is based on the fact that those who direct big businesses have only limited time to digest the many documents that reach them daily.

The Board hopes to publish 'Piped Heat' monthly or bi-monthly.

GASHOLDER CATCHES FIRE

A gasholder at Wellingborough, Northants., caught fire while it was being dismantled. The gasholder was only about 20 ft. from another which held about ¼ mill. cu.ft. of gas. The fire was extinguished while firemen cooled down the other holder.

Cape Asbestos sets up new subsidiary

THE Cape Asbestos Co. Ltd., is setting up a subsidiary company, Cape Insulation and Asbestos Products Ltd., to take over the management of thermal insulation, packings, jointings, and textiles.

The work of the present Contracts Division of Cape Asbestos will be taken over by the new company, and will be administered from Harts Lane, Barking, which will be the headquarters of Mr. J. L. Warren, Contracts Manager, Mr. H. T. Smith, Contracts Engineer, and their staff.

Gasworks closes

DURING the past week gasmaking has ceased at the Newport Works of the West Midlands Gas Board. In future the works will be used as a holder station supplied with gas from Wellington Works.

The closure is part of the West Midlands gas Board's programme of shutting down small works, which are costly to operate, and concentrating production in comparatively few large modern plants.

PERSONAL NOTES

MR. W. J. MASTERS, the Eastern Gas Board's first customer accounting officer in the Central Billing Office at Wood Green, retired recently at the age of 60 because of ill-health. Mr. Masters joined the gas industry with the former Swanage (Dorset) undertaking at the age of 15. In 1928 he joined the former Tottenham Gas Company as senior clerk in the audit department, became rental superintendent for the Board's Tottenham Division, and in 1957 became a member of the Central Billing Committee appointed by the Board. He will be succeeded by MR. M. T. BUTLER, formerly of Watford Division.

MR. M. S. GASKILL and MR. S. J. F. BEALE have been appointed Directors of W.G.I. Ltd. (West's Group of Industries). Mr. Gaskill retains his post as Technical Director, West's Gas Improvement Co. Ltd., and Mr. Beale continues as Managing Director of the Derbyshire Silica Firebrick Co. Ltd.

MR. C. J. BULLOCK has been appointed Chief Chemical Engineer of Bennett, Sons and Shears, Ltd., and has taken up his appointment at the company's head office in Leeds.

MR. G. U. HOPTON has been appointed the new Director of the Gas Council's London research station at the Fulham laboratories.

CORRESPONDENCE

Coal tar enamels

DEAR SIR,

In your report in the issue of November 16 of the paper given by Copp, Gooderham and Manners on 'Protection of Gas Service Pipes and Fittings' at the Joint S.C.I. and I.G.E. Symposium, you quote from a report of mine (C.T.R.A. Report 0238 June, 1959) which attempts to summarise the advantages and disadvantages of coal tar enamels. I should like to point out that this quotation divorced from its context gives a rather misleading impression as to the value of these materials which are so widely and successfully used in America and the Continent.

Unfortunately time did not permit me to make a verbal contribution to the discussion on this paper, but the following is a quotation from the written contribution which I submitted and which I had hoped would be published with the report of the paper.

'I would, however, like to comment on the statement on page 13 (of the paper) dealing with the alleged advantages or disadvantages of coal tar enamels.

'It should be made clear that the coal tar enamels referred to are not simply solutions of coal tar pitch in a volatile solvent; they are not the usual coal tar paints or "black varnishes". They consist of pitch in which finely divided coal has been digested and to which a mineral filler has been added, the whole fluxed back to the specified consistency with a selected tar oil.

'Their properties are controlled by the stringent specification of the American Water Works Association (C 203-57) in which tests to ensure absence of flow at high atmospheric temperatures and resistance to shatter or impact at low atmospheric temperatures are included.

'Thus, although it may be fair to say that coal tar enamels have more tendency to flow at high temperatures and to become brittle at low temperature than bitumen enamels, in practice they can be made to have a sufficiently wide plastic temperature range—i.e. the interval between their flow point and brittle point—that they are stable as regards flow or impact under arctic or tropical conditions.

'The third defect—their tendency to fume—is unfortunately an intrinsic property of these materials and cannot be eliminated; it must be controlled by the installation of fume extraction equipment at the coating plant.

'It is the unfortunate fact that such equipment is not noramlly installed at British pipe-coating plants (although almost universal in the U.S. and the Continent) that explains the reluctance of pipe manufacturers to use coal tar enamels.'

Yours sincerely,

DONALD MCNEIL.

Director of Research,
The Coal Tar Research Association.

£7 mill. gas processing plant plan

A £7 mill. gas processing and sulphur manufacturing plant is to be built in the Pincher Creek District of Southern Alberta by Shell Oil Company of Canada Ltd.

It will initially be designed to produce approximately 100 mill. cu.ft. of processed gas per day for delivery to Alberta and Southern Gas Co. Ltd., of Canada, for export to the U.S.

In addition, approximately 1,000 tons of sulphur per day, and between 3,500—4,000 barrels of liquid products per day, will also be produced.

About 70 men will be employed at the plant when completed, which is expected before the end of 1961.

POLES WILL USE MORE RED GAS

The supply of natural gas from the U.S.S.R. to Poland will be increased as a result of an agreement signed in Moscow recently. The U.S.S.R. will build a pipeline, using Polish pipes, from the Western Ukraine to the Polish frontier; the Poles will use the gas as a raw material in the chemical industry and as a fuel.

OBITUARY

MR. RONALD BROWN GLOVER, a director of W.G.I. Ltd. (West's Group of Industries) has died at the age of 71. Mr. Glover, the son of Mr. Samuel Glover who collaborated in the development of the Glover-West continuous vertical retort, joined the staff of West's Gas Improvement Company in 1912, and was shortly appointed clerk of works on installations of vertical retorts in various parts of the country. In the 1930's he toured installations in South America and became especially interested in that field. He was appointed a director in 1930.

MR. T. P. W. NORRIS, M.B.E., M.C., deputy chairman of George Kent Ltd., has died in a motoring accident at the age of 68. Before he joined the Board in 1958, Mr. Norris was chief personnel officer of the Vickers Group. He was also president of the Institute of Personnel Management.

MR. V. P. SCHOLES, one of the Birmingham area representatives of Smiths Industrial Division, has died at 42 years of age. Mr. Scholes was appointed in 1958 and was responsible for promoting the sales of Kelvin Hughes products.